

VACHE (A.F.)

ON THE
SURGICAL ANATOMY
OF
THE GROIN,
AS CONNECTED WITH
HERNIA OF THE ABDOMEN,
BY
ALEXANDER F. VACHE
OF NEW-YORK.

"Da mihi numine tuo vincere, Apollo!"

New-York :

PRINTED BY WILLIAM GRATTAN,

No. 8, Thames-street,

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ORIGINAL DISSERTATION

SURGICAL ANATOMY

THE UMBILIC

OF THE HUMAN BODY

PROFESSOR AND LECTURER

COLLEGE OF PHYSICIANS AND SURGEONS

UNIVERSITY OF TORONTO

WILLIAM FOSTER, M.D. PRESIDENT

AS THE 25th APRIL 1884

AND THE

DEGREE OF DOCTOR OF MEDICINE

AN
INAUGURAL DISSERTATION,
ON THE
SURGICAL ANATOMY
OF
THE GROIN,

SUBMITTED TO THE PUBLIC EXAMINATION OF THE
PROFESSORS AND TRUSTEES
OF THE
COLLEGE OF PHYSICIANS AND SURGEONS

OF THE
UNIVERSITY OF NEW-YORK,
WRIGHT POST, M. D. PRESIDENT,

ON THE 4th OF APRIL, 1825,
FOR THE
DEGREE OF DOCTOR OF MEDICINE.

TO
VALENTINE MOTT, M. D.
PROFESSOR OF SURGERY
IN THE
UNIVERSITY OF THE STATE OF NEW-YORK,
&c. &c. &c.
WHOSE SPLENDID DISSECTIONS OF THE ANATOMY OF THE GROIN,
AND
WHOSE DEMONSTRATIONS AND ILLUSTRATIONS
OF THE
HERNIA OF THE ABDOMEN,
DISTINGUISH HIM ALIKE AS THE PRACTICAL SURGEON
AND SCIENTIFIC LECTURER,
THIS DISSERTATION
IS MOST RESPECTFULLY PRESENTED,
BY HIS PUPIL,
THE AUTHOR.

PREFACE.

THE study of Surgical Anatomy, or the acquirement of the connexion and relative situation of one part with another in relation to surgical operations, is one of the most important requisites which operative surgery demands for its accomplishment. It is with this knowledge that the surgeon fearlessly performs the boldest of operations; it is this, in dark deep-seated places which distinguishes one part from another, and guides the knife correctly, and with perfect safety to the patient. It is this knowledge alone, which can give confidence to the operator, and save him from hesitation, confusion, and error. In short, it is to the assiduity and perseverance with which surgico-anatomical and pathological investigations have been pursued by the votaries of these particular sciences, that the splendid progress of surgery in modern days can alone be attributed.

The union of anatomy with pathology, or the knowledge of the natural state of our organs, with the various diseases to which they are subjected, can alone form the basis for correct reasoning on disease, and point out the most rational method of cure with which modern surgery may be enriched.

As such, I have selected the Surgical-Anatomy of the Groin, as connected with Hernia, for the subject of my dissertation; not however, with the wish of becoming an author, but solely with the view of conforming with one of the requisites for the obtaining of a degree. Should I succeed in elucidating the most trivial particular relative to this highly important piece of surgical anatomy, which I am aware has already undergone the closest investigations, I shall be satisfied. Should I fail, no disappointment will follow.

ESSAY ON
HERNIA ABDOMINIS.



HERNIA is the protrusion of any viscus from its natural cavity. Hernia, as a CLASS, may very properly be divided into three ORDERS, viz.

Hernia Cerebri,
Hernia Thoracis,
Hernia Abdominis.

To the last we confine ourselves exclusively.

Hernia of the abdomen is the protrusion of any of the abdominal viscera from their natural cavity, forming an external tumour. It consists of four distinct GENERA, viz.

Hernia Inguinalis,
Hernia Femoralis,
Hernia Umbilicalis,
Hernia Ventralis.

Inguinal hernia always protrudes above Poupart's ligament, and is of two SPECIES, viz. *Direct* and *Indirect*. Direct, when it comes

directly from the abdomen through the external ring. Indirect, when it comes indirectly from the abdomen through the internal ring, following the course of the spermatic cord, and most frequently protruding at the external ring. Femoral hernia protrudes below, and from under Poupart's ligament, and has no distinct species, but several varieties. Umbilical hernia, protrudes at the umbilicus. Ventral hernia, protrudes at any point not peculiar to the others. Besides these, there are herniæ protruding from the pelvic foramina, though of rare occurrence, which take their names from their location. There are also some internal herniæ, which are not, perhaps, strictly entitled to the appellation.



DISSECTION OF THE PARTS CONNECTED WITH INGUINAL HERNIA.

THE subject selected for this purpose should be emaciated, as this facilitates the dissection, and permits the parts to be shown distinctly. A male is preferable for inguinal hernia, and a female for femoral; the former, however, will answer for both purposes.

The subject should be placed on a common dissecting table, with a block passed under the body immediately above the pelvis, sufficiently high to put the abdominal parietes on the stretch. The hair is now to be shaved from the pubes, and then an incision is to be made from the upper part of the umbilicus in a straight line to the symphysis pubis. This is to be intersected by another, commencing at the umbilicus, and continued at right angles with the former, sufficiently far on the back to allow the anterior and lateral parts of the abdomen to be shown.

The dissection is to be carefully commenced on either side, at the angle formed by the incisions, being particular to remove the integuments alone ; and it is to be continued until the whole flap is turned off, when will be exposed to view the *Fascia Superficialis*.

The *FASCIA SUPERFICIALIS* is a firm, dense, inelastic membrane, pervading the whole body, lying immediately under the adipose substance of the common integuments, and thus forming one of the coverings to all the herniæ of the

abdomen; consequently it should be particularly noticed.

An incision is now to be made, in the same manner as the former, and this fascia is to be raised cleanly from the parts beneath, observing particular care at Poupart's ligament, with which it is intimately connected, and from which it cannot be easily separated. We now have exposed to view the external oblique muscle, and Poupart's ligament terminating its lower external boundary.

Previous to describing this muscle, it will be more strictly anatomical to observe the abdominal lines, which, however, are only in part brought within the limits of this dissection.

The LINEA ALBA is a white line, reaching from the ensiform cartilage to the symphysis pubis, and is formed by the tendinous insertion of the three abdominal muscles into their fellows of the opposite side. About midway of this line is to be observed the umbilicus, a cicatrix formed by the separation of the umbilical cord.

The *LINEA SEMILUNARIS* is seen on the outer edge of the recti muscles, of a semilunar shape, and is formed by the fleshy fibres of the abdominal muscles becoming at this point tendinous in their structure.

The *LINEÆ TRANSVERSÆ* are three, sometimes four tendinous intersections of the recti muscles, running across at right angles to their longitudinal fleshy fibres.

We now proceed to the consideration of the external oblique muscle, and successively to the remaining muscles of the abdomen ; annexing, however, their origin, which cannot be seen in this view of the parts, and attaching to each the points connected with inguinal hernia, as they appear on separate dissection.

OBLIQUUS EXTERNUS VEL DESCENDENS ABDOMINIS, arises from the outside of the eight lower ribs, a little posterior to the junction with their cartilages, by as many fleshy digitations with the serratus major anticus ; being connected, also, with the pectoralis major, intercostales, and latissimus dorsi muscles.

Its fibres run obliquely downwards and forwards, becoming tendinous at the *linea semilunaris*. Inserted fleshy, into the outer labium of the crista of the ilium ; tendinous, into the whole length of Poupart's ligament, by what is called the *outer column*, which terminates at the tuberosity of the pubis, in contradistinction to the tendinous fibres which separate, and are inserted into those of the muscle of the opposite side, at the symphysis pubis, called the *inner column*. It is next inserted into the whole length of the *linea alba* and the ensiform cartilage.

By the separation of the fibres of this muscle, above Poupart's ligament, an opening is left for the passage of the spermatic cord of the male, and the round ligament of the female, permitting their exit from the oblique canal. It has received the name of *external abdominal ring*, although of a triangular shape, bounded on each side by the two tendinous columns, with its apex above and its base below, formed by that part of the pubis between the tuberosity and symphysis. This opening can most generally be traced as far up as the fleshy fibres of the

muscle, and can be distinctly observed by a dark shade from the absence of the tendon, beneath where it is crossed at its upper part by numerous transverse tendinous fibres bounding and giving strength to it above. That the parietes should not, however, be weakened by this deficiency of tendinous matter, there are numerous layers of fibres sent off from the surrounding parts, crossing each other in all directions, and are intimately connected with the tendon of the muscle. Besides these, this part is also strengthened by a triangular tendinous portion furnished by the tendon of the opposite side, extending from the symphysis to the tuberosity of the pubis. This can be seen, on raising the tendon of one side, showing the fibres from the opposite muscle beneath.

It has been advanced, that this additional tendon of the muscle from the opposite side, besides strengthening the insertion of the internal oblique and transversalis into the pubis, also, when the abdominal muscles and linea alba are stretched, closes up a greater portion of the external ring; accounting, in this man-

ner, for the rare occurrence of direct inguinal hernia.*

This aperture in the male is about an inch in length; in the female, about half an inch: the round ligament being smaller, and less liable to suffer from the contraction of the muscle.

The use of the external oblique muscle is to assist to sustain the abdominal viscera, to bend the body to one side, and when both act, to approximate the chest to the pelvis: but when the pelvis is fixed, it draws down the ribs, becoming a muscle of expiration. It also assists the voiding of fœces and urine, by pressure on the abdominal and pelvic viscera.

The dissection can now be continued on the same side; but it is much better to dissect the opposite precisely as the former, that the one may remain unmolested, while the other must necessarily be disturbed for an inspection of the parts beneath. This leaves on one side the external parts in situ, while the other de-

* PROFESSOR COLLES', of Dublin, Treatise on Surgical Anatomy.

monstrates its connexion and relative situation with those within, and also adds much to the beauty and neatness of the view.

After this is accomplished, an incision is to be made on either side, of a semicircular form, extending from a little above the external ring, so that it may be preserved, and ending it a little within the termination of the tendinous fibre into those of a fleshy structure. The tendinous flap is to be raised from the muscle below, which will expose to view the lower margin of the internal oblique muscle.

OBLIQUUS INTERNUS-VEL ASCENDENS ABDOMINIS, arises fleshy from the outer third of Poupart's ligament, and from the whole length of the spine of the ilium, between the outer and inner labia; tendinous from the back part of the os sacrum, and from the transverse processes of the three last lumbar vertebræ. The fibres ascend obliquely upwards and forwards to be inserted into the lower edges of the cartilages of the five false ribs, by as many fleshy slips. Becoming tendinous at the linea semilunaris, it divides into two laminæ, forming a

sheath for the rectus muscle, at the inner edge of which the laminae again unite and terminate into the whole length of the linea alba, inserted, also, into the symphysis pubis, and into the ensiform cartilage. Its use is similar to that of the former, acting in a reverse direction.

The next muscle coming within this dissection, and which must be particularly noticed, is the *Cremaster*. This muscle always forms a covering to an indirect hernia, and when sufficiently strong to be seen, distinguishes it from a direct.

The CREMASTER arises from Poupart's ligament, just before the internal oblique commences its attachment, and has, by many, been described as additional fibres furnished by that muscle. The cremaster descends upon the spermatic cord from the inguinal canal, and is inserted into the tunica vaginalis of the testicle, upon which it spreads, and is insensibly lost. Its use is, to suspend and draw up the testicle, and to compress it in the act of coition, facilitating the passage of semen along the vas deferens. This muscle is stronger and more

visible from the presence of hernia of some duration.

The fibres of the internal oblique can now be detached from their origin, leaving the cremaster in its situation, as far as the external incision, and turned up so as to expose the transversalis beneath, and to allow of its further dissection when necessary.

TRANSVERSALIS ABDOMINIS arises tendinous, but soon becomes fleshy, from the inner surfaces of the six or seven lower ribs, and is connected to the diaphragm and intercostal muscles; also, from the transverse processes of the last dorsal and four superior lumbar vertebræ, from the inner labium of the crista of the ilium, and from Poupart's ligament, one third its length from its origin. The fibres run across the abdomen, become tendinous at the linea semilunaris, and, passing behind the rectus, are inserted into the symphysis pubis, into the linea alba, and into the ensiform cartilage. Its use is, to support and compress the abdominal viscera, and is, perhaps, the proper constrictor of the abdomen.

Previous to proceeding to the dissection of the transversalis muscle, as immediately connected with the subject, it may be well to observe the situation of the two remaining pairs of muscles of the abdomen, the recti, and pyramidales. They require no dissection, as they can be sufficiently observed through the sheath which contains them.

RECTUS ABDOMINIS arises tendinous from the ligament of the cartilage which joins the ossa pubium to each other. It soon becomes fleshy, and its fibres ascend broad and flat, parallel to the linea alba, to be inserted into the cartilages of the three inferior true ribs, and into the ensiform cartilage. Its fibres also frequently intermix with the pectoralis major muscle. Its use is to compress the fore part of the abdomen, to draw down the ribs in expiration, to bend the body forwards, and to raise the pelvis.

This muscle is generally divided by three transverse tendinous intersections, into nearly three equal portions, between its upper extremity and the umbilicus, and there is frequently a half intersection between it and the pubes.

These seldom penetrate the thickness of the muscle, but adhere firmly to the anterior part of the sheath, and very slightly to the posterior layer. By the tendinous intersections, it is enabled to contract at any of the intermediate spaces, and by its connexion with the other muscles it is kept in its place.

PYRAMIDALIS is enclosed within the same sheath, and arises in common with the rectus. It is inserted by an acute termination, about midway between the pubes and umbilicus. Its use is to assist the lower part of the rectus. This muscle is not always found.

The transversalis muscle can now be detached from its connexions below, and dissected neatly from the fascia beneath, sufficiently far up to expose to view the internal abdominal ring, which will complete all the dissection necessary for the abdominal muscles, and enough of the fascia transversalis for surgical purposes.

The FASCIA TRANSVERSALIS is a membranous expansion of various density; arising from Poupart's ligament, and immediately investing and

accompanying the peritoneum throughout its extent, it would seem to give additional strength to that delicate membrane, and defend it from friction during muscular action. In this fascia we find the internal abdominal ring.*

The INTERNAL ABDOMINAL RING is the aperture through which the spermatic cord of the male and the round ligament of the female make their first exit from the abdominal cavity. It is situated about midway between the superior spinous process of the ilium and symphysis of the pubes. To see this opening distinctly, it is necessary to remove the *Cylindrical process*, a process sent from its edges less dense than the fascia itself, and embracing and accompanying the cord to the external ring.

On raising the cord and opening the cylindrical process, we can then observe the internal ring to be rather oval than round, with its longest diameter placed perpendicularly to Poupart's ligament having well defined bor-

* We shall, for surgical purposes, consider these fasciæ as processes of Poupart's ligament, although not anatomically correct.

ders formed by two fibrous columns of the fascia itself.

These columns do not run into each other, but decussate ; the outer one crossing the inner in a direction towards the pubes, and terminating in the superior edge of Poupart's ligament. The inner, having a direction backwards and outwards towards the spine of the ilium, is lost in the posterior edge of the same ligament near to the mouth of the crural sheath.

These margins are frequently of a strong tendinous structure, and quite sufficient to effect a powerful strangulation at the neck of a hernial tumour.

The remaining parts to be noticed, are the spermatic cord and epigastric vessels, which ought to be particularly observed from the intimate connexion they have with the operations performed at the groin.

The SPERMATIC CORD is made up of the artery, vein, absorbents, and excretory duct of the testicle. It also receives branches from the in-

ternal iliac and epigastric arteries; and nerves, from the second lumbar and renal and aortic plexuses.

The SPERMATIC ARTERY arises from the lateral parts of the aorta, a little above the inferior mesenteric, and taking a course along the psoas muscles, crosses the ureter and reaches at length the internal abdominal ring; here it enters into the composition of the cord, accompanies it to the scrotum, disperses upon the epididymis of the testicle, and performs the secreting of the semen.

The SPERMATIC VEIN passes from the testicle along the cord into the abdomen, and, opposite to the lower end of the kidney, ends in a single trunk, which proceeds onward; that on the right side, terminating into the vena cava; that on the left, at right angles into the left emulgent vein. These veins have many valves.

The VAS DEFERENS is a cylindrical, cartilaginous tube for conveying the semen from the testicle to the urethra. It commences at the posterior and inferior part of the epididymis,

and takes a course along the back part of the cord until it reaches the internal ring, when it separates from it and passes downwards and backwards along the psoas muscle, and is attached to the side of the bladder. It then crosses the ureter and proceeds from behind forwards, between the vesiculæ seminales, until it reaches the prostate gland, where it unites with the duct of the vesiculæ seminales, forming a tube about an inch in length common to both. This perforates the prostate gland, and opens into the urethra by the side of the veru montanum. The covering of the spermatic cord is the tunica vaginalis, with the cremaster muscle spread on its surface.

THE TUNICA VAGINALIS is a process of the peritoneum, accompanying the descent of the testicle of the fœtus into the scrotum. Previous to the eighth month, the testicle is within the abdomen, lying below the kidney upon the psoas muscle, covered anteriorly and laterally by the peritoneum; about this time it descends, receiving direction, as is supposed, from a ligamentous substance named Gubernaculum. In consequence of more peritoneum being brought

down into the scrotum than was in close adhesion with the testicle, we have a loose or reflected portion not adhering to it, constituting the cavity of the tunica vaginalis. This process of peritoneum may be divided into two portions; the tunica vaginalis of the cord, which has its cavity obliterated soon after birth by adhesion;* and the tunica vaginalis of the testicle which remains disconnected, excepting at its posterior part, and secretes a lubricating fluid.

The cremaster muscle, if it has not been removed, can now be distinctly seen, taking, from its origin, a course towards the external ring, along the inferior edge of the cord, and is lost on the tunica vaginalis testis.

The **EPIGASTRIC ARTERY** is about the size of a crow quill, and arises from the external iliac as it is about passing under the crural arch. It runs upwards and inwards, from one to two inches, between the fascia transversalis and peritoneum; it then perforates the fascia obliquely and runs anterior to it. A little above

* When this does not occur, a passage is afforded for intestine, constituting the hernia congenita.

this, it penetrates the posterior sheath of the rectus; and near the umbilicus, it enters the substance of that muscle previous to its meeting with the internal mammary artery.

It thus takes a course between the two rings, on the inner edge of the internal ring, and on the outer edge of the external ring. In the inguinal canal it gives off a branch to the spermatic cord; and within the sheath of the rectus it supplies lateral branches to that muscle.

This artery has been found, and not unfrequently, to arise from the external pudic, also from the *arteria profunda femoris*. Occasionally it arises high up from the external iliac, it then takes a course downwards, then forwards and upwards, to pass in its usual direction. Doctor Monro mentions a specimen, in which it arose from the obturator, and ran upwards and inwards to the rectus muscle. There are also some other uncommon origins mentioned, but they so seldom occur, if at all, as to be hardly worth acknowledging.

The only remaining artery to be known and described, as connected with hernia, is the obturator. This can be examined at any future time, and much better from an injected preparation ; we will however proceed, while on the arteries, to a description of it, and conclude the particular anatomy of this part of our subject, by an examination and description of the peritoneum.

The OBTURATOR ARTERY is generally a branch of the internal iliac, and taking a course a little below, and nearly parallel to the brim of the pelvis, passes out together with the obturator nerve, at the small hole in the upper part of the obturator ligament, and is distributed principally to the upper part of the triceps muscle.

With this origin and course, this artery does not come within the operations for inguinal or femoral hernia, and would be of little surgical importance. It however has various origins, and thus becomes of some consideration.

It not unfrequently arises by one common trunk with the epigastric from the external

iliac, and occasionally from the same artery by a separate trunk ; with this origin it passes by Gimbernat's ligament, and is connected to it by cellular substance. It has also been seen to come from the femoral artery, within the crural sheath. Mr. Anderson mentions a case, in which it arose from the ordinary place, and took its usual course ; but that a branch was also given off from the inside of the external iliac under the crural arch, that took a curved direction over the linea ileo pectinea, and joined the former a little behind the hole in the obturator ligament, forming a common trunk to be distributed in its usual manner.*

The various origins of these arteries, unfortunately, cannot be ascertained at the time of operating, and thus produce no variation in the mode of performing it ; but will account for any unusual hemorrhage which may take place. Some of them, however, are not endangered, and those which are must take their chance.

The PERITONEUM is an expansion of dense cellular membrane, enveloping the abdominal

* See *System of Surgical-Anatomy*, p. 74.

viscera, and is also partly reflected upon some of the contents of the pelvis. It is a white, thin, shining membrane of the serous class ; its inner surface smooth, secreting a serous fluid for its lubrication, and forming no adhesions ; its outer surface covered by the fascia transversalis, investing the inside of the abdominal muscles, the posterior part of the abdomen, and the surface of the several viscera.

The peritoneum superiorly and inferiorly lies anterior to the abdominal viscera, and is loosely attached about an inch or two above Poupart's ligament previous to its descending to line the posterior part of the abdomen. Thus, when a hernia occurs, it yields readily to the pressure of the protrusion, and accompanies it out of the abdomen, forming the hernial sac.

The HERNIAL SAC is a common covering to all the abdominal hernia, with the exception of congenital, which also, it will be remembered, is a process of the peritoneum, descending with the foetal testicle, taking the name of tunica vaginalis.

Having completed the dissection and particular anatomy of the individual parts, as they appear in regular succession under the knife, we shall now take a general review of them, connecting the relative situation of one with the other, their connexion with inguinal hernia, and the operation for its relief when strangulated.



OF THE GENERAL ANATOMY OF INGUINAL HERNIA.

We commence by restoring the parts to their natural situation, and we then find, by beginning externally, that the order will be as follows.

First, the common integuments. Secondly, the fascia superficialis, which are both common coverings, and always form the two external coats of a hernial tumour. Thirdly, the external oblique muscle, inserted into the whole length of Poupart's ligament, containing the external abdominal ring for the passage of the male or female cord, and through which a direct inguinal hernia always protrudes:

it would thus have for its coverings, besides the hernial sac, the integuments and fascia superficialis. Fourthly, the internal oblique muscle; and fifthly, the transversalis. The two last form the superior boundary of the oblique canal, and by the former extending a little lower down than the latter, a valvular structure is given them, rendering additional strength to the parts.

The OBLIQUE OR INGUINAL CANAL can now be seen to be the space between the external and internal abdominal rings. It is bounded anteriorly by the tendon of the external oblique muscle; posteriorly by the fascia transversalis; superiorly by the lower edges of the internal oblique and transversalis muscles; and inferiorly by Poupart's ligament. In this canal, we find the spermatic cord, or the round ligament, covered by the cylindrical process from the internal ring, and the cremaster muscle lying at its lower edge. By this construction, the oblique canal will be observed superiorly to be of a valvular structure, adding strength to the parietes when pressed upon by the viscera, and, by the openings for the passage of

the cord being removed a distance from each other, a greater security is given against hernial protrusions, than if they were in apposition, allowing a direct passage to the cord from the abdomen.

We next observe the fascia transversalis to be in close contact with the peritoneum, and containing the internal abdominal ring midway between the spine of the ilium and symphysis of the pubis, and through which an indirect hernia always protrudes, carrying the cremaster muscle before it, and in this additional covering alone differs from a direct. Through this opening the cord enters from the abdomen into the oblique canal.

The relative situation of the epigastric artery and vein to the rings, can now be particularly observed, the vessels running on the inside of the internal and on the outside of the external ring; consequently the division of the stricture at the former would be safely performed directly outwards, and at the latter directly inwards; but to be perfectly safe, for fear of mistaking the species, it can be divided directly upwards in both.

We now observe the situation of the spermatic cord, which can be seen occupying the inferior edge of the internal ring, and probably kept in its place by the weight of the testicle. It then takes an oblique direction through the inguinal canal, and passes out at the external ring accompanied by the cremaster, and descends into the scrotum to the testicle.

The situation of the spermatic cord, as regards direct and indirect herniæ, is generally behind the neck of the sac; there are, however, occasional varieties in which it gets before it, and sometimes it seems to be divided; the vas deferens getting in front of the sac, or on either side. This may also occur to the blood vessels.

All that remains to be noticed, is the peritoneum, as forming the hernial sac.



OPERATION FOR INGUINAL HERNIA.

The operation for direct inguinal hernia consists of a middle incision through the integuments, extending the whole length of the tu-

mour, which are to be dissected off, when the fascia superficialis beneath will be exposed to view. The fascia superficialis is next divided and turned off, when the hernial sac, to which we have now come, presents itself. Here the knife is to be placed flatwise, and this coat is to be cut into, delicately and cautiously ; which is generally manifested by the escape of a quantity of fluid, although this does not always occur.

A director is now to be introduced, and the sac freely dilated, by placing a bistoury in its groove and cutting outwards. The finger is then introduced to the seat of stricture, and the nail, if possible, insinuated within it. A probe pointed bistoury is now introduced flatwise on the face of the finger, and then turned up, dividing the stricture, to be perfectly safe, directly upwards.

After this, the contents of the sac should be cautiously examined, and particularly the strictured part, to ascertain if there are any ulcerations at the seat of strangulation, and whether it be returnable or not. If returnable, and should it be intestine, the gut is to be emptied

as much as possible of its contents, and the last portion protruded passed into the abdomen first, and so successively, until it shall be returned. If not returnable, it must then be left in the sac, and subjected to one of three alternatives. First, by leaving it entirely to nature, and allowing the intestine to slough, when an artificial anus will be the consequence. Secondly, by removing the intermediate diseased portion, and bringing the edges together, connecting them by an uninterrupted suture making an attempt at union. Thirdly, by introducing one extremity of the divided gut within the cavity of the other, sewing it in the same manner, to accomplish the same purpose as the former.

Should these attempts fail, there is still another means by which union may be effected, independent of the duration of an artificial anus. This project owes its origin to the ingenuity of Mr. Dupuytren. It consists in bringing each extremity of the divided gut in lateral contact, and the blades of a bluntly serrated forceps, with bulbous extremities, are introduced separately into the open mouth of each intestine. The forceps is then locked, making

of course the most pressure at their extremities, thus promoting the absorption of intestine at that point, and establishing a communication between the two. The forceps is now removed, and when the fœces pass readily through the new made aperture, the extremity of each intestine is to be united, which, when accomplished, is returned to the abdomen.

Union, I think, ought always to be attempted, for if it succeeds, a very great object is attained; if it fails, the patient is precisely in the same situation as though it had been left to nature.

The operation for indirect inguinal hernia does not differ from the former, when the protrusion reaches the external ring, with the exception of its having one more covering, the cremaster muscle. This protrusion, however, does not always reach the external ring, but occasionally remains within the inguinal canal; consequently it is beneath the tendon of the external oblique muscle, which is then divided, and exposes the fibres of the internal oblique, more or less, according to the muscularity of

the subject, covering the hernial sac, which is seen after turning them up.

The seat of stricture, in indirect hernia, may be at the external ring, within the inguinal canal, or at the internal ring; that must be ascertained at the time of operating; and the same rules govern this precisely as do the direct.



DISSECTION OF THE PARTS CONNECTED WITH FEMORAL HERNIA.

In the dissection of the parts connected with femoral hernia, we shall follow the same order as observed in inguinal; that is, each part separately, as it appears on dissection; and then collectively, after the dissection is completed.

For this purpose an incision is to be made, commencing at the pubes, a little within the external ring, continuing it on the scrotum, and terminating it about six inches down the inner side of the thigh. The dissection is to be commenced at the upper part, and the integuments

alone are to be removed. Next, the fascia superficialis is to be dissected off, removing with it the superficial glands of the groin, which are enveloped in it. We now have exposed to view the fascia lata of the thigh, and ascending on its inner anterior surface the major saphena vein.

Previous to proceeding with the dissection and description of these parts, Poupart's ligament, or, more properly, the inguinal ligament, and its connexions, first claim our notice.

The INGUINAL LIGAMENT arises from the anterior superior spinous process of the ilium, and is inserted in the tuberosity of the pubes, into the symphysis pubis, and into the linea ileopectinea. This last insertion has received the name of Gimbernat's ligament, and was supposed to be the seat of stricture in femoral hernia. The inguinal ligament is a firm fibrous substance, and has by many been considered as formed by the interior termination of the tendon of the oblique muscle; by others it has been considered as two distinct ligaments; the superior one of a rounded appearance, extending

from the ilium to the pubes, retaining its original name ; and the inferior one inserted by Gimbernat's ligament into the linea ileo pectinea, taking the name of crural arch, from its arched appearance, and under which the great vessels pass out from the abdomen. This division, however, would seem to be more the effect of the knife, dividing and removing the cellular substance between its fibres, than from any real existence.

We shall consider it anatomically as one ligament, retaining however, for perspicuity, the name of crural arch, as more immediately expressive of the aperture through which femoral or crural hernia protrudes. The inguinal ligament has three processes, viz. the fascia transversalis, running directly upwards between the peritoneum and transversalis muscle ; the fascia lata, running downwards and investing the muscles of the thigh ; and the fascia iliaca lining the iliacus internus muscle.

We can now proceed to the removal of the fat and cellular substance immediately about the crural arch, being careful not to take away

the anterior portion of the sheath of the femoral vessels. All the dissection necessary being now completed, we will consider the processes of the inguinal ligament.

The FASCIA TRANSVERSALIS has already been noticed when on inguinal hernia, and nothing more remains to be described, with the exception of a process sent down the leg, forming the anterior part of the sheath of the vessels, which shall be more particularly spoken of when on the femoral sheath.

The FASCIA LATA is a thick shining membrane of a fibrous structure, enveloping the muscles of the thigh. It arises from the spine of the ilium, from the inguinal ligament, and from the arch of the pubes, and is divided at the upper and fore part of the thigh into two portions, viz. the pectineal or pubic, and the iliac portions of the fascia lata.

The PUBIC PORTION arises from the arch of the pubes, and invests the gracilis and pectinalis muscles. All that part of it, superior to the point at which the saphena enters the femoral vein,

passes inward under the sheath of the vessels, and is lost among muscular fibre. Inferiorly it passes under the saphena on the face of the sheath and becomes continuous with the iliac portion.

The ILIAC PORTION arises from the spine of the ilium, runs inwards covering the sheath of the vessels, and terminates in an abrupt edge at the inguinal ligament. It is the termination of this edge interiorly which has received the name, from its crescentic or falciform appearance, of *crescentic edge* or *falciform process* of the fascia lata. It is about two inches in length, its upper horn passes down by the inner side of the femoral sheath, and is connected to Gimbernat's ligament; its lower horn passes under the saphena vein, immediately below where it terminates into the femoral, to meet its fellow portion of the opposite side.

It can now be readily conceived in looking at the parts, how a femoral hernia must necessarily protrude from under the iliac portion and rest upon the pubic.

The fascia iliaca can be examined next, if desired, or it can be left for a more advanced stage of the dissection. We however, to finish the fasciæ, will describe it.

The FASCIA ILIACA arises from the inner labium of the crista of the ilium, and from all the posterior edge of the inguinal ligament, with the exception of that part forming the crural arch. By this origin from the iliac portion of the inguinal ligament, or that space from the outer edge of the sheath to the spine of the ilium, a hernia is prevented in that direction; and by the origin, from the inner edge of the crural sheath to the symphysis pubis, a space is left between the two for the passage of the femoral vessels to descend to the thigh. This last portion of the fascia iliaca is continuous with the fascia transversalis, and passes down into the cavity of the pelvis to be attached to the bladder.

The fascia iliaca has its posterior surface in contact with the iliacus internus and psoas magnus muscles, and the upper part of the anterior crural nerve. Its anterior surface is con-

nected with the iliac vessels, and loosely with the peritoneum.

The only particular importance attached to this fascia, as connected with hernia, is a process sent down under the femoral vessels, forming, as it were, a floor for them to rest on, and which joining laterally with the process from the fascia transversalis, makes up the femoral sheath.

The fascia lata can now be detached from its connexion with the inguinal ligament, and carefully turned off, that the femoral sheath which comes next to be examined, may be exposed.

The FEMORAL OR CRURAL SHEATH is a membranous canal enclosing the femoral vessels. It is formed anteriorly by the process of the fascia transversalis, and posteriorly by that of the fascia iliaca; the one forming the roof, and the other the floor, connected at the sides.

The femoral sheath, by its superior portion arising from the circumference of the arch of the

inguinal ligament, and becoming narrower, and in closer contact with the vessels, as it proceeds down the thigh, is of a funnel like form.

On cutting into this sheath, we can distinctly see that it is a regularly circumscribed cavity, convex at its superior surface ; we can also see that point at the upper and forepart about an inch and a half from its commencement, where the saphena perforates the sheath to join the femoral vein.

The point to be most particularly noticed, and which is of essential importance to be acquainted with and understood, is that part called the *cribriform portion* of the femoral sheath. It is situated on its anterior and inner surface a little below the crural arch, and is the place at which the subcutaneous absorbents of the thigh perforate it, to enter a gland lying within this canal.

These holes are about twelve in number, and the portion of the femoral sheath thus perforated, is that part which yields to the pressure of a hernial protrusion, and forms, with

the assistance of the reticular membrane, the *fascia propria* of a femoral hernia.

All that now remains to be observed within this canal, is the relative situation of the artery with the vein, and the seat of the crural ring. The femoral artery is seen occupying the outer boundary of the sheath, and the vein lying on the inside of the artery nearly in the centre, and divided from it by a septum of a membranous structure.

The CRURAL RING is that part of the sheath seen from the abdomen, and is the space between the vein and Gimbernat's ligament. This is occupied by the glands through which the absorbent vessels pass into the pelvis, and is the aperture through which femoral hernia protrudes, and the seat of stricture when it is strangulated.

The dissection and the description of the individual parts of femoral hernia being now finished, we will proceed to the revision of them, as they are respectively situated and connected with each other.

OF THE GENERAL ANATOMY CONNECTED WITH FEMORAL HERNIA.

As in inguinal hernia, we restore the parts to their natural situation, and we then find the following arrangement :

First, the common integuments. Secondly, the fascia superficialis. Thirdly, the inguinal ligament having one origin from the spine of the ilium, and three insertions, viz. into the tuberosity of the pubis, into the symphysis pubis, and into the linea ileo pectinea, forming Gimbernat's or the femoral ligament. It also has three processes, the fascia transversalis, running upwards ; the fascia iliaca, investing the iliacus internus muscle ; and the fascia lata, covering the muscles of the thigh : this last consists of two portions, the pubic and iliac ; the pubic covering the gracilis and pectinalis muscle, the iliac covering the outer and anterior part of the thigh, and terminating at the inguinal ligament in a falciform manner, making the falciform process or crescentic edge of

the fascia lata. The saphena major vein is seen ascending on its surface, and terminating in the femoral at the inferior termination of the crescentic edge.

Next, we have the femoral sheath of a funnel like form, lying under the iliac portion of the fascia lata, and made up anteriorly of a process or continuation of the fascia transversalis downwards, and posteriorly of a process of the fascia iliaca continued in the same direction. In the anterior part of the sheath, we find the cribriform plate, marking the entrance of the absorbent vessels to a gland within it. We are also to remember that from the weakness of this part, from its numerous perforations, it becomes together with the reticular membrane, the covering immediately preceding the hernial sac, constituting the fascia propria.

On opening the crural sheath, we observe the relative situation of the vessels, that the artery is on the outside, and the vein on the inside, divided by a septum from each other, and that the crural ring, occupied by glands, is the space between the vein and Gimbernat's ligament,

through which femoral hernia protrudes, and by which it is strangulated.

A femoral hernia must thus have for its coverings the integuments, the fascia superficialis, the fascia propria, and the hernial sac.



OF THE OPERATION FOR FEMORAL HERNIA.

This consists in making a transverse incision through the integuments along the base of the tumour, its whole length. This is met by another, two or three inches in length, as may be required, terminating at the middle of the former : the two making the form of the letter T inverted.

The flaps of integuments are to be dissected off, and the fascia superficialis then removed by similar incisions. We now have reached the fascia propria, which in a similar manner is to be carefully dissected from the hernial sac.

The knife is now placed flatwise, and a small hole cut through this last covering, the accomplishment of which, the escape of a fluid will most probably evince. Should this not occur, the anatomy of the parts can be the only cautious guide.

The same rules and caution are now to be observed in the division of the hernial sac, and dilatation of the stricture, as mentioned in inguinal hernia; that of introducing a director, and placing the bistoury within its groove, and cutting freely outwards; next, introducing the finger to the seat of stricture, keeping the protrusion behind it, and introducing the probe pointed bistoury flatwise upon its face, and then turning it upwards.

The stricture in this protrusion is at the crural ring, and is to be divided upwards and inwards; thus the epigastric artery and the femoral vein are avoided, which might otherwise be opened and be of serious consequence.

This protrusion, if returnable, is to be returned in the same manner as in inguinal hernia,

and if not, must then take its chance for union by adhesion, or an artificial anus must be the consequence.



OF THE ANATOMY CONNECTED WITH UMBILICAL AND VENTRAL HERNIÆ.

The dissection of the parts connected with these two forms of hernia, was included in the same performance with inguinal, and needs no particular description. They protrude directly from the abdomen, the former at the umbilicus, the latter at any point not peculiar to the others, and consequently have three coverings; the common integuments, the fascia superficialis, and the peritoneal hernial sac.

The operation for their relief when strangulated, must be governed by the size of the tumour. Generally a simple incision through the integuments in the long axis of the tumour, and continued successively through the remaining coats is sufficient. Sometimes, when large, a T incision is necessary, and when still larger, a crucial is required.

The division of the stricture must be governed by the location of the tumour, having a particular reference to the course of the epigastric artery.

Pelvic herniæ are so rare as to require no distinct head or description.



I have now arrived at the end proposed in my preface ; but it would be doing an injustice to my feelings to conclude this essay, without acknowledging the obligations due to my distinguished preceptor, Doctor MORT, not only for the opportunities afforded me of seeing his masterly dissections, and hearing his scientific elucidations of the subject of Hernia, but also, of witnessing his operations performed for it, in all its various forms.

To his bright example I owe my taste and desire for surgical knowledge ; and whilst I reflect on his manly exertions to elevate his profession to the highest point of excellence and public usefulness, I can never want an incentive necessary for its complete acquirement.

To him I return my thanks, and shall always remember with pleasure, the many kind attentions I have received from him both privately and publicly.

THE END.

